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(54) Screw-capped container

(57) A screw-capped container comprises a lug and a protuberance on each of the cap and the container arranged so that, when the cap is in a desired position on the container, a cap lug 17 abuts a container lug 25, positively to prevent the cap from being over-tightened, and the protuberances 15, 27 abut one another, to retain the cap in the desired position, the or each protuberance or the part on which it is located being deformable so that, on application of sufficient screwing force the protuberances are able to move over one another, thereby to allow the cap to be unscrewed from or screwed-on to the desired position.

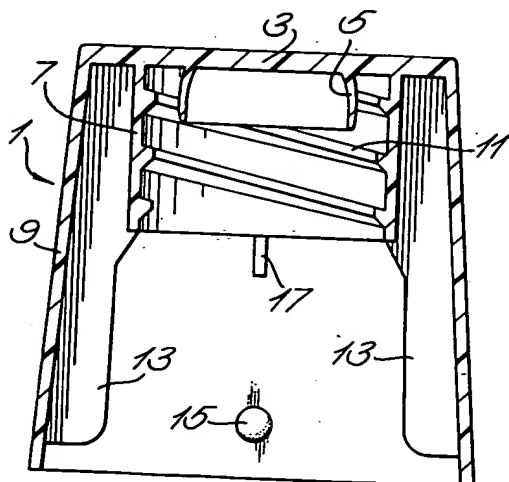


FIG. 2.

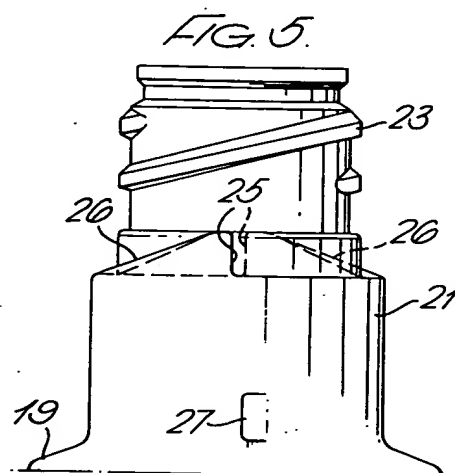
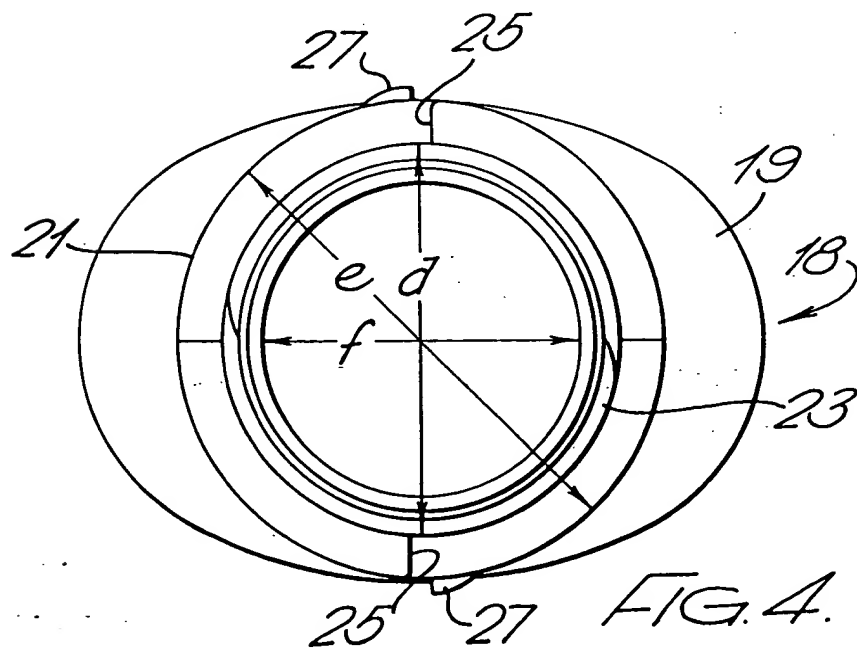
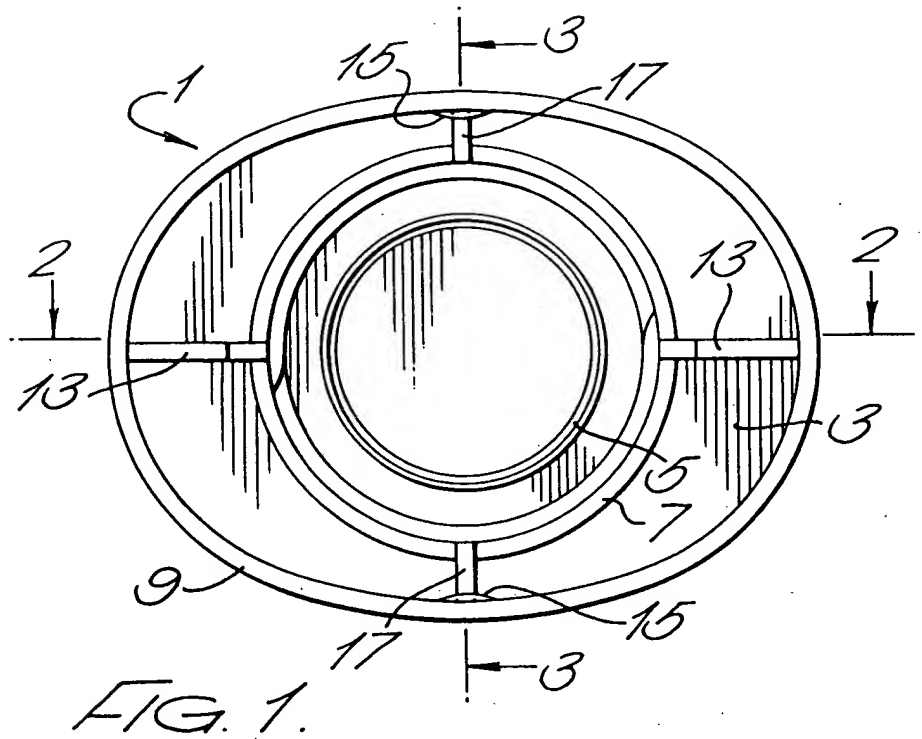


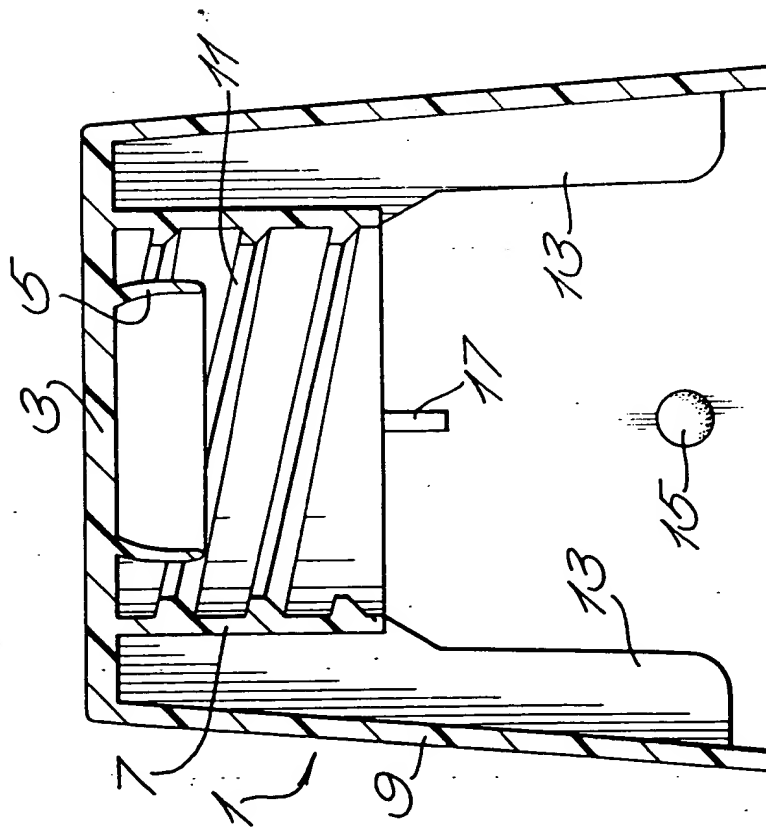
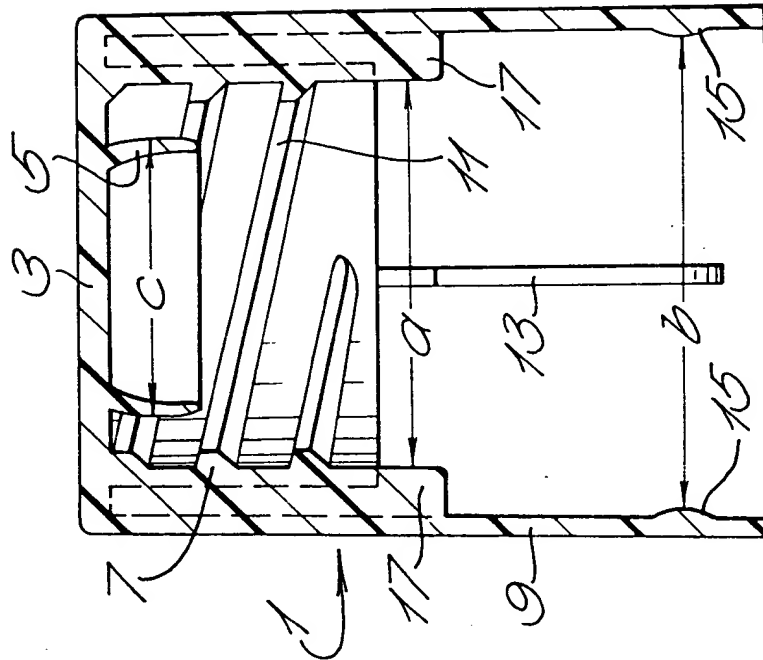
FIG. 5.

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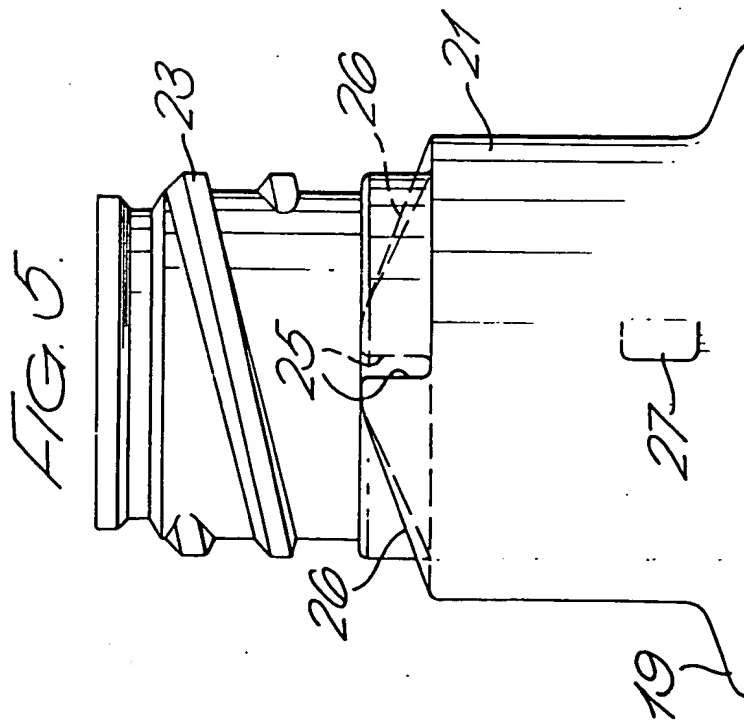
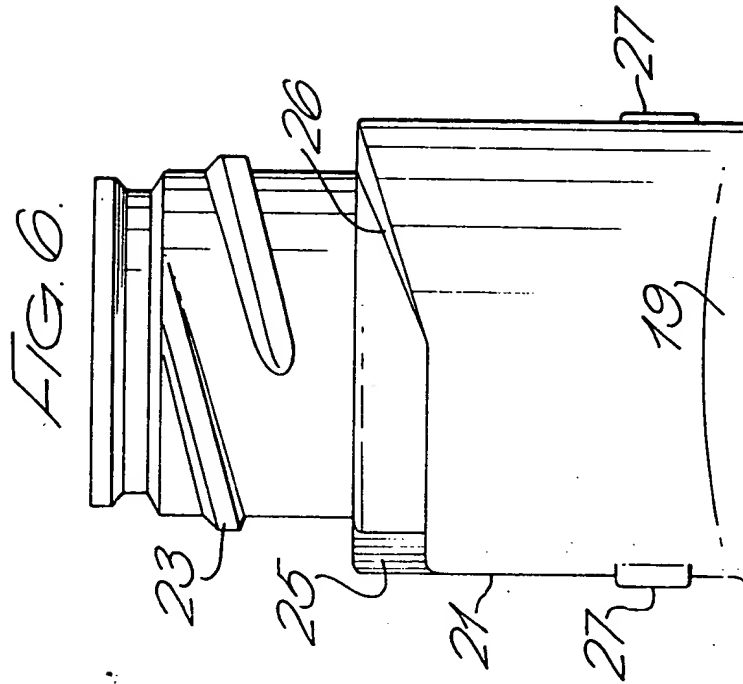
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SPECIFICATION

Screw-capped container

5 The present invention relates to a screw-capped container which has an arrangement for retaining the cap in a desired position relative to the container.

Screw-capped containers, especially bottles, are commonly used to contain a wide variety of liquids, 10 such as shampoos, disinfectants and perfumes.

Repeated screwing-on or unscrewing of the cap, especially if the cap is overtightened, may cause the screw thread on either the cap or the container to become deformed. This may weaken the seal formed 15 by the cap on the container, thus allowing loss of the contents of the container by evaporation and/or leakage. Moreover, the cap may work loose, for instance during transit, or become unscrewed accidentally, again allowing loss of the contents of the 20 container.

Overtightening of the cap on the container may also result in the cap being excessively stressed and this may, especially in a hostile environment or in the presence of a hostile product, result in cracking and 25 consequent leakage. Overtightening may also result in thread jumping which may cause leakage and thread damage to occur.

Some screw-caps for containers, which may be non-circular in cross-section, are designed to be 30 aligned in a particular position on the container so that the closed container has a visually pleasing aspect, as well as to avoid overtightening. The cap may be designed to be aligned with features of pattern or shape on the bottle. However, if either of the threads 35 becomes deformed, it is difficult to align the cap on the container in the desired position.

It is therefore desirable to provide a screw-capped container having an arrangement for retaining the cap on the container in a desired position.

40 A screw-capped bottle having such an arrangement is disclosed in British Patent Specification No. GB-A-1 261 772. The cap disclosed therein has a hem on its skirt which snaps into matching engagement with a shoulder on the bottle to prevent overtightening.

45 However, the reliability of this arrangement depends to some extent on the quality of the material from which the bottle and/or cap are made. If the material is too elastic, the arrangement may be deformed so that it is no longer possible to ensure that the cap and 50 bottle retain the desired relative position.

Another screw-capped bottle having such an arrangement is disclosed in British Patent Application No. GB-A-2 017 061. The arrangement comprises a notch bearing member on the cap or bottle which 55 co-operates in snap lock fashion with a protuberance on the bottle or cap respectively. The notch bearing member or the protuberance is deformable to enable the protuberance to snap into the notch.

The efficiency of this arrangement is also to some 60 extent dependent on the quality of the material used

to form the protuberance or notch bearing member. For instance, if one is made of a softer material than the other, the opening and closing of the bottle may result in the wearing away of the softer member, 65 especially as the cap snaps into place on the bottle. This will mean that it will no longer be possible to ensure that the cap is retained in the desired position. In many cases, the cap will be of a softer material than the bottle, and it will therefore be the cap which wears 70 away.

According to the present invention, there is provided a screw-capped container, the cap and the container each having a lug and a protuberance arranged so that, when the cap is in a desired position 75 on the container, the lugs abut one another, positively to prevent the cap from being over-tightened, and the protuberances abut one another, to retain the cap in the desired position, the or each protuberance or the part on which it is located being deformable so that, on 80 application of sufficient screwing force the protuberances are able to move over one another, thereby to allow the cap to be unscrewed from or screwed-on to the desired position.

It is envisaged that the present invention will be of 85 particular, but not exclusive, use where the container is a bottle, especially on having a cap of non-circular cross section.

Preferably both the cap and the container have two lugs, disposed diametrically opposite one another, 90 and two protuberance also disposed diametrically opposite one another. The lines connecting the lugs and protuberances may be coincident or may be offset from each other by an angle of up to 45°. Preferably, the lines are only slightly offset.

95 In a preferred embodiment, the protuberances on the cap are located on a part of the cap which is resiliently deformable. Conveniently, the protuberances are also to some extent resiliently deformable.

Conveniently the or each protuberance on either the 100 container or the cap has on one side a ramp up which the protuberance with which it co-operates moves towards the desired position, the other side of the protuberance being disposed radially so that the co-operating protuberance snaps into place as the 105 desired position is reached. In a preferred embodiment, the or each ramped protuberance is formed on the container and is not resiliently deformable. The protuberance which co-operates with a ramped protuberance is conveniently part-spherical.

110 The cap may comprise a socket part, defining a screw thread for co-operation with the screw thread on the container, and a skirt part surrounding the socket part. The socket part is preferably tubular, but may also be of ellipsoidal or other rounded cross- 115 sectional shape.

In a preferred embodiment, the skirt part is made of a resiliently deformable material and has the or each protuberance thereon so that the skirt is able to deform to allow the protuberances to move over one 120 another. This embodiment is particularly suitable for

use with screw-capped bottles wherein the caps are non-circular in cross-section.

Preferably, the skirt is oval in cross-section. However, it may also be of any other asymmetric rounded shape or any angular shape in cross-section. For instance, the skirt may be square or rectangular in cross-section.

The cap may also include a seal member disposed inside its screw thread for fitting in sealing relationship inside the opening of the container when the cap is in the desired position.

Each lug on the cap may comprise a flat piece of material extending beyond the screw thread, the co-operating lug on the container being formed below the screw thread thereon. Preferably the or each lug on the container is strengthened, for instance by a wedge portion behind it.

In a preferred embodiment, wherein the container is a bottle having a neck on the top of which is formed the screw thread, each co-operating lug on the bottle is formed on the neck immediately below the screw thread. However, the lugs on the bottle may also be located on the shoulder or body of the bottle with the lugs on the cap located on the outside of the cap or its skirt.

The container may be manufactured from any of the materials presently used, for instance glass, plastics or a composite material, in conventional fashion. For instance, plastic containers may be manufactured by injection moulding, vacuum forming or blow moulding.

Preferably the caps are made of plastic materials using, for example, an injection moulding technique.

Although the container is preferably a bottle, it may also be a pot, jar or tin, depending on the material which it is designed to contain.

The advantage of the screw-capped container of the present invention is that the cap is firmly retained in the desired position and cannot be overtightened on the container. There is a much reduced chance of the screw threads becoming deformed, of the cap cracking or splitting due to stress, or of thread jumping occurring. Moreover, the cap cannot become unscrewed accidentally. Good sealing of the container can be readily achieved and loss of the contents of the capped container by evaporation or spillage is substantially avoided. The positive positioning of the cap on the container ensures that caps of special design or non-circular cross-section can be correctly aligned on their containers. The snap lock achieved on screwing on the cap to the desired position indicates to a user that the cap is fully screwed on.

A preferred embodiment of a screw-capped container according to the present invention wherein the container is a bottle is described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a plan view from below of the cap;
Figure 2 is a sectional view along line 2-2 of Figure 1;
Figure 3 is a sectional view along line 3-3 of Figure 1;
Figure 4 is a plan view of the bottle;
Figure 5 is a front view of the neck of the bottle; and
Figure 6 is a side view of the neck of the bottle.
Referring to Figures 1 to 3, the cap 1 comprises a

concentrically formed a cylindrical seal member 5, a tubular socket part 7 and a skirt part 9.

A screw thread 11 is formed on the inside of the socket part 7. Strengthening ribs 13 are formed between the skirt part 9 and the socket part 7 and also serve to locate the cap as it is applied to the bottle.

The skirt part 9 is oval in cross-section, has a pair of part-spherical protuberances 15 formed on the lower part of its inside on opposite ends of its minor axis, and is resiliently deformable.

A pair of lugs 17 in the form of non-deformable stop flats are formed between the socket part 7 and skirt part 9, and extend from the base 3 past the screw 11. The lugs 17 are also disposed at or near opposite ends of the minor axis of the skirt part 9.

Referring now also to Figures 4 to 6, the bottle 18 comprises a plastics moulding having a body (not shown), an oval shoulder portion 19 and a neck portion 21. A screw thread 23, for co-operation with the screw thread 11 on the cap, is formed on the top of the neck portion 21.

Immediately below the screw thread 23 are formed, on diametrically opposite sides of the neck portion 21, two lugs 25 for co-operation with the lugs 17 on the bottle. The lugs 25 are strengthened by the formation of wedge shapes 26 behind them so that the lugs are not deformable.

On the lower part of the neck portion 21, on diametrically opposite sides thereof, are formed two ramp-shaped protuberances 27 for co-operation with the protuberances 15 on the cap. As can be seen from Figures 4 and 5 the lugs 25 are slightly offset from the protuberances 27. The protuberances 27 increase in width towards the lugs 25.

The dimensions a, b and c shown in Figure 3 are equal to the dimensions d, e and f respectively shown in Figure 4.

In use, the cap 1 is screwed onto the bottle 18 and the lugs 17 move towards the lugs 25. As the lugs approach one another, the protuberances 15 approach the ramp-shaped protuberances 27. As the protuberances 15 move over the ramps, the skirt part 9 resiliently deforms to allow this movement.

The cap and bottle are so designed that, as the lugs 17 and 25 come into abutment, the protuberances 15 reach the wider end of the protuberances 27 and the resilience of the skirt part 9 causes the protuberances to snap back radially towards the neck portion 21. The radial faces of the protuberances 27 then abut the protuberances 15, thus locking the cap on the bottle. When the cap is in this position the seal member 5 comes into sealing relationship with the inside of the screw-threaded part of the neck portion 21, and the major axis of the skirt part 9 is parallel with the major axis of the shoulder portion 19. This is the desired position for this screw-capped container.

To unscrew the cap 1, sufficient unscrewing force is applied to cause the skirt part 9 to deform so that the protuberances 15 and 27 are able to move over one another. As the protuberances 15 and 27 move over one another, the skirt part 9 recovers its original form and the cap 1 can easily be unscrewed.

The arrangement described above is an improvement over the previously disclosed arrangements

be made using non-deformable material and construction, thereby ensuring that the cap is only screwed on as far as the desired position, while the co-operating protuberances ensure that the cap is snap-locked in the desired position and cannot become accidentally unscrewed.

CLAIMS (Filed on 1 August 1983)

1. A screw-capped container, the cap and the container each having a lug and a protuberance arranged so that, when the cap is in a desired position on the container, the lugs abut one another, positively to prevent the cap from being over-tightened, and the protuberances abut one another, to retain the cap in the desired position, the or each protuberance or the part on which it is located being deformable so that, on application of sufficient screwing force the protuberances are able to move over one another, thereby to allow the cap to be unscrewed from or screwed-on to the desired position.
2. A screw-capped container according to claim 1 wherein the container is a bottle and the cap has a non-circular cross-section.
3. A screw-capped container according to claim 1 or claim 2 wherein both the cap and the container have two lugs, disposed diametrically opposite one another, and two protuberances, also disposed diametrically opposite one another.
4. A screw-capped container according to claim 3, wherein the lines connecting the lugs and protuberances are coincident or are offset from each other by an angle of up to 45°.
5. A screw-capped container according to any one of claims 1 to 4, wherein the protuberances on the cap are located on a part of the cap which is resiliently deformable.
6. A screw-capped container according to any one of claims 1 to 5, wherein the or each protuberance on either the container or the cap has on one side a ramp up which the protuberance with which it co-operates moves towards the desired position, the other side of the protuberance being disposed radially so that the co-operating protuberance snaps into place as the desired position is reached.
7. A screw-capped container according to claim 6, wherein the or each romped protuberance is formed on the container and is not resiliently deformable.
8. A screw-capped container according to any one of claims 1 to 7, wherein the cap comprises a socket part, defining a screw thread for co-operation with the screw thread on the container, and a skirt part surrounding the socket part.
9. A screw-capped container according to claim 8, wherein the skirt part is made of a resiliently deformable material and has the or each protuberance thereon so that the skirt is able to deform to allow the protuberances to move over one another.
10. A screw-capped container according to any one of claims 1 to 9, wherein the cap includes a seal member disposed inside its screw thread for fitting in sealing relationship inside the opening of the container when the cap is in the desired position.
11. A screw-capped container according to any one of claims 1 to 10, wherein each lug comprises a flat piece of material extending beyond the screw formed below the screw thread thereon.
12. A screw-capped container according to any one of claims 1 to 11, wherein the or each lug on the container is strengthened, for instance by a wedge portion behind it.
13. A screw-capped container according to claim 2 or any claim dependent thereon, wherein each co-operating lug on the bottle is formed on the neck immediately below the screw thread.
14. A screw-capped container according to any one of claims 1 to 13, wherein the caps are made of plastic materials using, for example, an injection moulding technique.
15. A screw-capped container according to claim 1, substantially as hereinbefore described with reference to the accompanying drawings.
16. A screw-cap for location on a container to provide a screw-capped container according to any one of claims 1 to 15.
17. A container for receiving a cap to provide a screw-capped container according to any one of claims 1 to 15.

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